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Short Communications

The Indigenous Hill-farming System of Khasia Tribes in Moulvibazar District of Bangladesh: Status and Impacts[1]

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Rapid economic growth of the Khasia people has resulted from a most successful betel leaf farming system practiced within the fringe of reserved forests, where government policies have facilitated effective use of the local people as a labour force for production, protection and conservation of biodiversity of the surrounding forests. Khasia tribes have traditionally grown betel leaf plants on naturally occurring trees. Deforestation is a serious problem in Bangladesh, whereas the Khasia people living within forests are protecting trees for their livelihood, including selling betel leaf, collecting fuelwood and consuming and selling fruits from support trees. It is a profitable yet sustainable forest production system, maintaining soil fertility, stable production and optimal family size, and has created employment opportunities for the people living within and outside the forests. It has enhanced the supply of socially required betel leaf to the local markets, contributed to price stability, and generated some export revenue. However, the revenue of growers has been reduced by plant diseases and the capture of resource rent by middlemen. Economic benefits could be further increased through government initiatives to improve management and the marketing system.

Key Words: hill farming, betel leaf, Khasia tribes, sustainable forestry, indigenous management

INTRODUCTION

Bangladesh, with a predominantly flat landscape, has about only 12% of hill land area mainly in the eastern and south-eastern part of the country. Tribal communities have long lived in these hilly areas. There are 27 tribal communities in Bangladesh

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(Khaleque 1998). The annual deforestation rate in natural forests in Bangladesh during 1981-1990 was 3.3% (GOB 1992). Forest tribes depend on shifting cultivation and illegal logging for their sustenance, which caused denuding of large tracts of hill forests. However, the hill-farming system practiced by the Khasia people in Sylhet division has been considered a sustainable system, as argued by Chowdhury and Mahat (1993) and Nath *et al*. (2003).

Lamb (2002) identified three options for overcoming forest degradation, presenting a conceptual model of the trade-offs between the ecosystem integrity of the reforested ecosystem and the human well-being promoted by reforestation (Figure 1). Relative to this framework, the betel leaf production system supports forest rehabilitation while promoting community well-being (category 1). It should be noted that forest lands which were degraded by intensive shifting cultivation have been reforested and protected by the Khasia tribes who were allotted land for betel leaf production for their sustenance.

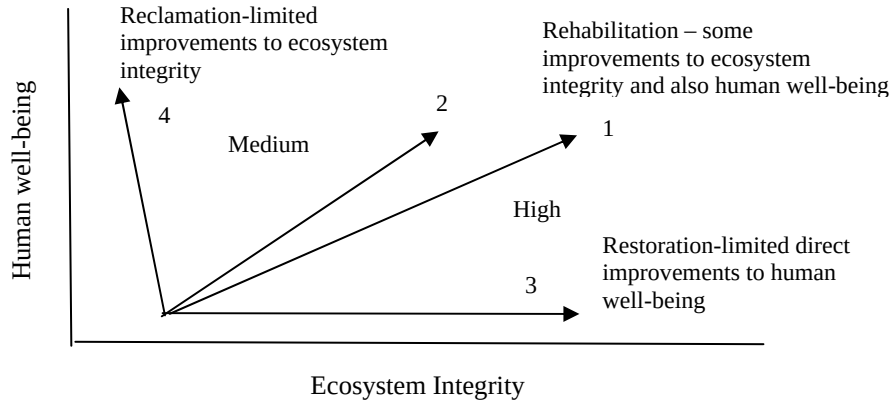

Figure 1. Trade-offs in reforestation

Betel leaf (*Piper betel*) is an important crop throughout Bangladesh and the neighbouring countries. It is a perennial dioecious climber that creeps up the trees supported by its adventitious roots. The leaf is commonly chewed with slices of betelnut (*Areca catechu*) and a thin coating of catechu and lime. It is a common and sometimes mandatory item at social functions. Both betel leaf and betel nut have medicinal values and a huge internal market exists in Bangladesh.

A number of studies have been conducted on farming systems of tribal communities in Bangladesh, but there has been little research on the Moulvibazar district in general and betel–leaf-based hill farming in particular. This study analyzes the indigenous hill-farming system of Khasia tribes in Moulvibazar district and its socio-economic and environmental impacts, and explores measures for improving the existing management system. The paper first reviews the history of Khasia forest villages. The methodology and findings of a survey of Khasia farmers are then reported. Finally, comments are made about the sustainability of this hill-farming system.

HISTORICAL PROFILE OF DEVELOPMENT OF KHASIA FOREST VILLAGES

The Khasia tribes dominate in the Sylhet division in north-eastern Bangladesh, particularly the Moulvibazar district, having settled there about 500 years ago. Khaleque (1998) reported that in the past, most of the tribal communities lived by subsistence agriculture, but a market economy has emerged with their integration into mainstream society. Khasia people have developed their own market-oriented tree and betel-leaf-based farming system (Alam and Mohiuddin 1995) and, particularly in the case of those living within the fringe of reserved forests of Moulavibazar district, have been growing betel leaf on naturally growing trees since 1952.

The reservation process of forest land commenced in Sylhet in 1914. Previously, shifting cultivation was practiced extensively in all forest areas, and many became grazing lands for the local people. The land condition did not improve after reservation (Pant 1989). The 'Forest Village' concept was initiated during the early part of 20th century and was constituted with local tribes without any proper records and demarcation as a measure to control shifting cultivation (Saha 1998). This concept was first applied in the Chittagong and Chittagong Hill Tracts Forest Divisions, which were established in 1872 and 1909, respectively (Saha 1998). The Forest Department settled landless local tribes in the forest vicinity, where they were expected to carry out forestry work as daily labour in return for the right to grow agricultural crops along with forestry crops. Allotments were granted to the forest villagers on a renewable basis for 99 years. Almost all the forest villages are now expanding at an alarming rate through encroachment. The original villagers have been inviting their relations and allotting forest land to them, due to the absence of any proper village records and demarcation, and the situation appears to be out of control in many areas.

Development of forest villages commences in two parallel and strategically linked processes. First, forest villagers supply their labour for production, protection from pilferage and conservation of biodiversity of the surrounding reserved forests. Second, forest villagers can live within the forest vicinity by constructing houses and practicing agroforestry systems, where they obtain returns from agricultural crops. In general, this policy has failed in that most forest villagers live in the forestland, but do not practice any type of farming. As a result, the villagers have no alternative sources of income other than daily labour wages paid by the Forest Department. Sometimes they help the outsiders to exploit forest resources illegally.

When it was evident this approach had failed, the Forest Department registered a few Khasia people as forest villagers in Sylhet Forest Division in 1952. Each family was allotted about 1.27 ha of forestland (including about 0.06 ha as house land), with defined boundaries, renewable on a biennial basis for 99 years. The tenure was designed to ensure farmers have a continuing incentive to meet their obligations to the Forest Department. These people, who had relocated from near the Indian border, were granted forestland for their house construction and betel leaf farming with naturally growing trees. They have a social structure in which each village is headed by a minister (headman). All Khasia households deposit their deeds with the minister who generally handles all formalities with the Forest Department. They perform the activities for the Forest Department as a group, while individually

farming their own land, drawing on their indigenous knowledge of cultivation. The Khasia forest villages in the Sylhet region were observed to be an exception to the forest village scheme. In Sylhet Forest Division, the plantation program gained momentum in the period 1955-60 with the establishment of about 200 ha per year, and increased in 1975-1980 to about 500 ha per year (Drigo *et al*. 1988).

RESEARCH METHOD

The study area is a reserved forest area of Lawachara beat of Moulvibazar Forest Range of Sylhet Forest Division, located about 30 km south of Moulvibazar, bounded by $24^0 19'$ north latitude and $91^0 47'$ east longitude (Canonizado and Rahman 1998). The terrain includes numerous isolated hillocks of 100 to 200 feet height. The lower hill slopes with undulating topography are under tea cultivation. The soil varies from clayey loam on level ground to sandy loam on hilly ground. The moist tropical maritime climate is characterised by moderately cool and dry conditions from mid-November to the end of February and high precipitation from April to September. The mean annual rainfall is 3800 mm, and humidity remains high at 70% to 85% most of the year. The mean annual maximum and minimum temperatures are 33^0C and 18^0C, respectively. Most of the Khasia villages are concentrated in Moulvibazar district. Out of five *upazila* of Moulvibazar district, Kamalganj *upazila* was selected, and out of the seven Khasia villages in Kamalganj *upazila*, the village of Magurchara Pan Pungi was selected as the survey area.

A set of questions were framed to ascertain important indicators of betel leaf farming systems. An exploratory survey of Khasia tribes in Moulvibazar district was carried out during May to July 2003. For the main survey, a list of all 40 households of the Magurchara Pan Pungi was prepared, 20 were selected at random, and personal interviews and field observations were undertaken. The number of trees by species was recorded for the area of trees around the homestead of each respondent. The farm area was further sampled, randomly selecting three 10 m by 10 m quadrats from each selected farm, and the number of trees of each species was collected for each sample quadrat.

RESULTS AND DISCUSSION

Land Use

The farmland area of 1.21 ha and on average half of the homestead area (of 0.06 ha) was planted to trees, each family having 1.24 ha of land for betel leaf farming. Decisions for planting, maintenance, harvesting and selling are usually taken by male head of the family, but with consultation with his wife and other family members.

The vegetation of farmland in the study area is natural, with secondary regrowth of varying age combination and density. The study identified 33 plant species in the farmland and 18 plant species in the homestead area, with six species in common.

Out of the 45 species, 37 were used as support trees.[2] The important species in terms of wood value and suitability for betel leaf farming in the farmland are jarul (*Lagerstroemia flosreginae*), awal (*Vitex spp.)*, chapalish (*Artocarpus chaplasha*), kalajam (*Syzygium cumini*), rata (*Amoora wallichi*), toon (*Cedrela toona*), bonak (*Schima wallichii*), simul (*Salmalia malabarica*), kadam (*Anthocephalus chinensis*), dumur (*Ficus racemosa*), dhakijam (*Syzygium grandi*), jam (*Eugenia spp*.), dewa (*Artocarpus lakoocha*). The most important species in the homestead area are kanthal (*Artocarpus heterophyllus*), betel nut (*A. catechu*) and mango (*Mangifera indica*). Only 17% of the species grown in the farmland are well suited for betel leaf farming. These trees are owned by the Forest Department. Because the trees in the farmland have low value, the Forest Department does not procure trees from such land, and the farmers are also not allowed to fell these trees. In the homestead area, 79% of the tree species are well suited for betel leaf farming, and the rest are important as fruit trees. The stocking density on farmland was found to be 1262 trees per hectare excluding seedlings and saplings, with a wide variety of diameter classes.[3]

Chapalish (*A. chaplasha*) and betel nut (*A. catechu*) are regarded as the most suitable tree species for betel leaf farming. Chapalish is a large deciduous tree with tall straight bole, attaining a height of about 30 – 40 m, with a girth (dbh) of 3 – 5 m (Zabala 1989). It also has a high timber value, and requires no pruning. Betel nut is a large evergreen palm with tall straight bole, attaining a height of about 24 m, with a girth of 15.5 cm (Khan and Alam 1996). It also provides income to the farmers through sale of fruit, and requires no pruning.

Indigenous Management Techniques

To plant betel leaf, farmers first clean the land, slashing and uprooting shrubs and ground flora and keeping only the trees and their saplings, during the drier months of November to February so as to minimize soil erosion. Generally cuttings with four nodes are taken as propagules from 2-3 year old vines, collected without charge from nearby gardens. During the commencement of the rainy season in May-June, the betel leaf cuttings are planted near the support trees, with one cutting per tree. The ground is weeded three times in a year, with weeds used as mulch. No chemical fertilizers are used. Betel leaf grows well in partial shade, and the support trees (other than betel nut and chapalish) are pruned once a year, during the dry months, prunings being used as fuelwood. They are watered once a year during the dry months. It was reported by the Khasia people that betel leaf plants have been infected by a disease known locally as *utram*. Infected leaves dry out and ultimately the vine dies. This disease occurs during times of high rainfall and humidity. Farmers generally uproot all betel vines in infected plots and keep the land fallow for 1-3 years before replanting.

Plucking of betel leaf starts in second year and continues for about 12 years, after which plants are generally attacked by disease. Leaves are harvested three times a year, with peak production during June-July, and no production from mid-March to

[2] Alam and Mohiuddin (1995) reported that at least 30 tree species are used as support trees for betel leaf plants. Nath *et al*. (2003) identified 61 plant species in the farmland.

[3] Alam and Mohiuddin (1995) reported that there were 2500-3000 trees per hectare with a wide range of diameter classes on a typical betel leaf farm.

mid-May. Plucking of betel leaf continues until the plant dies naturally or is attacked by disease.

Both male and female family members participate in betel leaf garden preparation and maintenance. Male members (and hired labourers) usually do the heavier work, including pit digging, weeding, pruning, watering and plucking. Female members and children participate in light work, including sorting and packing the leaves. Sometimes hired labourers are also engaged in light work.

Khasia people believe that dancing in their betel leaf farm before planting will induce better crops. After death, the bodies of Khasia people are cremated. The ashes are then kept in an earthen pot inside their houses, and buried in the farmland when planting new crops. The belief is that, if the soul of the dead enters the crop field, fertility increases and the crop grows well. Khasia people bathe before going to their farmland and harvesting betel leaves. They believe that if they bathe all evil will be washed away and their garden will be free from pests and diseases. Whenever a diseased leaf or branch touches their bodies, they immediately bathe so that the disease cannot spread.

Marketing of Betel Leaf

The supply chain for betel leaf is illustrated in Figure 2. Khasia people carry leaf from their farmland and home garden to their houses and sort and pack the leaf. *Fariah* (who have little capital) and *befari* (larger firms) from cities up to 100 km away (including Sylhet, Sherpur, Banugach, Srimongal, Novigonj, Habigonj, Kamalgonj and Moulvibazar), travel to the farms and negotiate prices. *Fariah* and *befari* gather all purchased betel leaves at the roadside by shoulder load. *Fariah* and *befari* obtain advance money from the *arathdar*, who is the controller of market prices. *Befari* must supply their purchased betel leaves to the *arathdar*. *Fariah* sometimes sell their purchased leaf to the *befari* and sometimes directly to the *arathdar*. The *arathdar* sells leaves to retailers, and sometimes exports leaf to India and the United Kingdom with higher price margins. Retailers sell leaf to hawkers and small retail shops, who then directly supply consumers. The farm products fetch higher prices in the town areas than on the farms. It is estimated that consumer prices of betel leaf are about three times the farmgate prices. The benefits of high market prices go to the middlemen rather than to the farmers. Transportation of betel leaf from garden to town areas is difficult due to inaccessibility to the forest areas. It is also one of the causes of higher prices. The reliable supply leads to a stable consumer price for betel leaf.

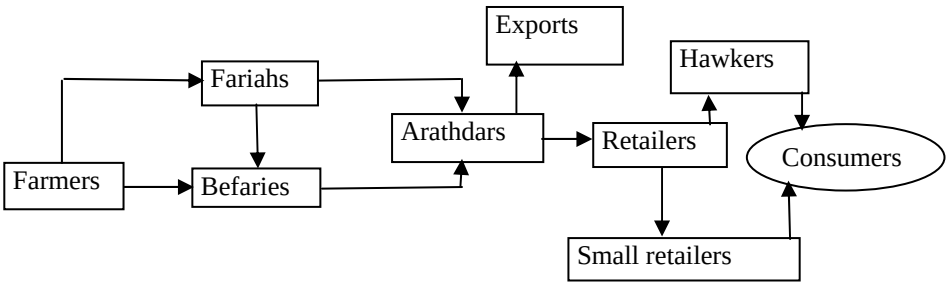

Figure 2. Intermediaries in marketing of betel leaf

Profitability of Betel Leaf Based Farming

Income generation from the betel-leaf-based forest farming system is continuous and long-term. A major cost item is employment of year-round labour for intensive tending operations. From survey data, the annualised return per farm is estimated to be Taka 277,396[4], and the present value of leaf production per farm (over a 12-year planning horizon and with a discount rate of 8.5%) is estimated to be Taka 2,039,673. Intensive tending operations are required to attain the above return. Other than betel leaf and food production, it was observed that Khasia tribes obtain fuelwood from farmland for their daily cooking and fruit from homestead land for consumption and sale. Profitability can be increased by undertaking disease prevention measures. Intensive research is needed into control of betel leaf diseases. Improvement of marketing systems can also increase returns to farmers. About 85% of respondents agreed that there is a need to develop integrated betel leaf production and the growing high-value tree species. The condition of integration is that 60% of the production from tree species would accrue to the participant and 40% to the Forest Department, with all production costs born by the Forest Department. This arrangement benefits the Khasia tribes as well as creating an avenue for generating revenue for the government on a perpetual basis.

SUSTAINABILITY OF THE SYSTEM

Forest dwellers are dependent on forest resources to meet their daily needs. Due to population pressure on forest resources, the sustainability of hill-farming systems has become an important global issue. Nath *et al*. (2002) argued that at the farm level, sustainability could be indicated by (i) maintenance or improvement of soil fertility, (ii) stable or increased yields of the major crops, and (iii) a stable or only slowly increasing farm population. Khasia people use decomposed weeds and pruning materials as organic fertiliser, which are sufficient to maintain soil fertility and avoid soil toxicity which may arise from application of inorganic fertiliser. The productivity remains stable with the application of these materials.

Some socio-economic characteristics of sample members are presented in Table 1. The average family size was found to be six persons. Khasia households take a cluster form. Only the youngest girl can live with her parents. Other adult male family members reside outside the forestland. After the youngest girl marries, she and her husband live with her parents. In this way, they maintain small population size on the allotted areas, and the prevailing production is enough to maintain their livelihood. The family members who live outside forestland lease land from unused private tea gardens and fallow land of the Land Ministry for betel leaf cultivation. They maintain their living from the income of these farms.

[4] US$ 1 =Taka 60, approximately.

Table 1. Demographic information of the study area

Characteristic	Level
Average family size	6
Male-female ratio	1:1.05
Occupation (%)	
Betel leaf farming	100
Business	5
Service	5
Daily labour	60
Mean monthly income (Taka)	14,164

Source: Field survey from May-July, 2003.

The mean monthly income in 2002-2003 was found to be about Taka 14,164 (seven times the national average income of Bangladesh), most of which was derived from selling betel leaf. The farmers were able to save a considerable amount of this income and to invest for purchasing or establishing a new farm.

The Khasia farming system generates employment for many forest dwellers. Some Khasia people do not work in the Forest Department's land, but rather hire outsiders to meet their obligations to the Forest Department. While this contributes to employment opportunities for outsiders, it is in conflict with their lease agreement.

CONCLUDING COMMENTS

Under the circumstances of population pressure, poverty and scarcity of land resources in Bangladesh, it is critical that land be intensively utilised for sustainable development. The government policy of rehabilitation of Khasia people and conservation of biodiversity has improved land-use efficiency. Khasia people have been gaining a legal right to use the Forest Department's land peacefully. Employment opportunities have been generated. Their income has increased substantially both growing betel leaf on farm and homestead land as from earning daily labour wages from the Forest Department for production and protection of reserved forests. The farming system has been enhancing the supply of socially required betel leaf to the local markets and contributing to the price stability. The Khasia people have emerged as a dynamic social group. As well as providing social security and economic benefits to the Khasia tribes, betel leaf forest farming is a sustainable hill-farming system, contributing to replenishment of the forest reserves of Moulvibazar district, protection of timber plantations, and protection and conservation of biodiversity of the surrounding reserved forests.

Economic benefits can be increased and ecological stability maintained by improving the existing management system through government initiatives, such as providing funds for research and policy intervention into betel leaf diseases, marketing of betel leaf, integration of suitable high-value tree species, and benefit sharing. This approach of hill farming has potential to be applied to other regions of Bangladesh, where shifting cultivation is a serious threat to environment and livelihoods.

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